



# International Journal of Cryptocurrency Research

Publisher's Home Page: <https://www.svedbergopen.com/>



Research Paper

Open Access

## The Feasibility of Blockchain Technology as a Tool for Zimbabwean Financial Inclusion: An Online Desktop Review

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### Article Info

Volume 2, Issue 2, December 2022

Received : 30 December 2021

Accepted : 22 November 2022

Published : 05 December 2022

doi: [10.51483/IJCCR.2.2.2022.1-11](https://doi.org/10.51483/IJCCR.2.2.2022.1-11)

### Abstract

Using the research of David Chaum, Stuart Haber, Scott Stornetta, and Nick Szabo on concepts related to Blockchain Technology (BT) as foundation, an unknown person, under the pseudonym "Satoshi Nakamoto", invented the first blockchain network which supported Bitcoin (BTC), the first-ever cryptocurrency, in 2008. With the passing of time, BTC gained popularity, and, in recent times, it was declared as a legal tender of El Salvador. Since the invention of BTC, various industries have started to see the value of BT, leading to relevant uptake and the creation of more crypto assets (e.g. Dogecoin, Litecoin and Ethereum). Though research suggests that BT can serve as a vital tool that promotes better financial inclusion—especially in developing countries—BT is often met with significant resistance due to discrepancies between its value in use and its value in exchange. Notwithstanding the foregoing, this study was conducted to ascertain the feasibility of BT in Zimbabwe, as a tool to promote financial inclusion. To achieve the study's objective, non-empirical, exploratory research was conducted that took on the form of an online desktop review. From the research conducted, it appears that BT is a feasible tool that can curb financial inclusion problems, particularly in Zimbabwe—at least in a theoretical dispensation.

**Keywords:** Blockchain Technology, Bitcoin, POW, POS, POA, Cryptocurrency, Crypto asset, Ethereum, Decentralized Finance, DeFi

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### 1. Introduction

Blockchain Technology (BT) is predominantly used in supporting crypto assets. In layperson's terms, a crypto asset is defined as a digital representation of value, mainly used as a currency (cryptocurrency), utility token, and security token (South African Revenue Services (SARS), 2021; Quantifi, 2021). In an informal dispensation, the concept<sup>1</sup> of crypto assets was first introduced in 1921 by Henry Ford, as a measure to stop wars through neutralizing the influence of countries holding large quantities of gold reserves (New York Tribune, 1921). In 1924 however, Ford reluctantly abandoned his plans (Edwards, 2020). A few years on, during 1989, David Chaum started the company *DigiCash*, with the primary aim to develop an independent electronic money

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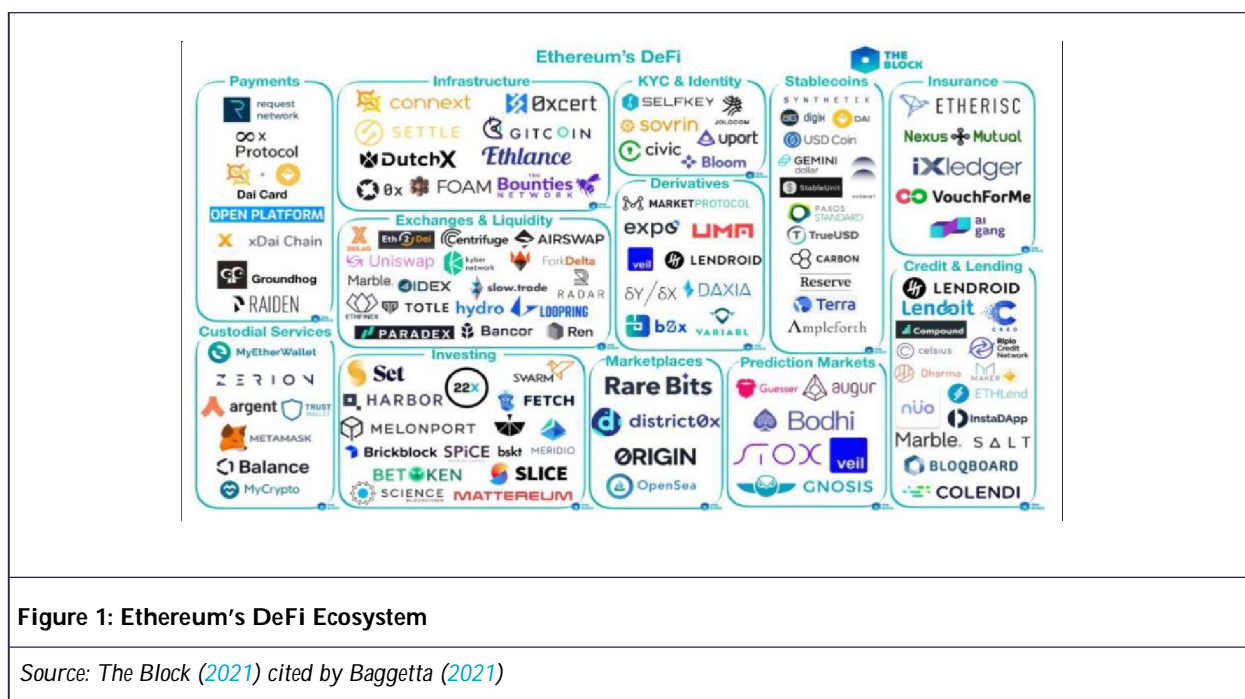
<sup>1</sup> In an attempt to redistribute power, thereby putting an end to wars, Henry Ford planned to replace the gold standard (printed money backed by gold held by a country) with an energy powered currency (New York Tribune, 1921).

system (Hussey, 2019). This system's currency was called *Cyberbucks* and was the first digital currency that was not controlled by a central authority (Hussey, 2019). In 1998, *DigiCash* filed for bankruptcy.

In 1996, Douglas Jackson founded a payment system that functioned on the currency called *e-gold* (Koning, 2019). One of the biggest differences between *e-gold* and the currencies of its predecessors was that *e-gold* was backed by physical gold (Koning, 2019). After roughly more than a decade, problems with regulators resulted in *e-gold* coming to a sudden halt in 2009. Also, during this timeframe, Szabo (1999) started working on a decentralized digital currency called *Bit-Gold*, using the idea of Henry Ford as a foundation. Unfortunately, despite Szabo's efforts, this project did not materialize due to variable challenges surrounding computational costs and the value of this energy currency (Szabo, 1999). After Szabo's efforts to realise Henry Ford's idea, "Satoshi Nakamoto" followed a similar approach as Szabo, but decided to separate the value of an energy currency from its computational costs (Nakamoto, 2008). Otherwise stated, "Satoshi Nakamoto" decided to ignore the cost of energy required to develop an initial coin, while leaving the value of the coin to the fate of supply and demand. The efforts of "Satoshi Nakamoto" led to the founding of Bitcoin (BTC) in 2008, during the global financial crisis (Kenny, 2019).

Notwithstanding the latter, most of the components that make up today's BT was discussed in a study by Chaum (1982). Haber and Stonertta (1991) expanded on the latter by explaining how a digital document can be timestamped. The main objective of their research was to make digital documents that are immutable. After the development of BTC, "Satoshi Nakamoto" developed BTC blockchain—the first blockchain network that supported this currency—and was publicly made available in January 2009 (Hoy, 2017). The BTC blockchain could not support other applications and there was a need to improve on this aspect. This was particularly the case since BTC (a decentralized digital currency) could not support and/or be integrated with decentralized finance (DeFi)<sup>2</sup> (Ethereum, 2021).

As time elapsed, Vitalik Buterin launched the Ethereum blockchain in 2015, with the intention of allowing other applications to run on it, giving rise to DeFi (Baggetta, 2021). The aspect of DeFi evident in the Ethereum blockchain is depicted in Figure 1.



In addition to supporting DeFi, the Ethereum blockchain is envisioned to be used by stakeholders in the gambling industry, as well supply chains and logistics industries in the foreseeable future (EthereumPrice, 2021). Since the development of the Ethereum blockchain, many other blockchains emerged.

BT is predominantly used to support crypto assets such as cryptocurrencies (Crypto Finance Institute, 2021), and more potential stakeholders are becoming more comfortable with the idea of using BT in their various industries and/or communities (Leible et al., 2019). In essence, BT is starting to become more desirable

<sup>2</sup> A system where financial services are not controlled by intermediaries, thereby resulting in a financial ecosystem that is transparent, open source, without permissions being required (LeewayHertz, 2021).

because of its unique features of decentralization, immutability, and transparency (Leible *et al.*, 2019; Xu *et al.*, 2019). The fact that some big companies already have BTC on their balance sheets, can almost be inferred that BT is here to stay. Furthermore, the adoption of BTC by El Salvador<sup>3</sup> (a country in Central America) as a legal tender, sets the tone at the top for the possible adoption of crypto assets as formal international assets (Murray, 2021). In quintessence, there is a probability that BT will soon be internationally regarded as a tool to support financial systems (Xu *et al.*, 2019). Considering that BT is regarded by many as a disruptive technology, it is expected that there will be significant resistance to its inevitable and imminent change (Xu *et al.*, 2019). This is particularly the case in developing countries since most governments in Africa are still hostile towards this disruptive technology (Noone, 2021).

Using the above as a basis, the primary objective of this study was to ascertain the feasibility of using BT as a tool to enhance financial inclusion in Zimbabwe, in a theoretical sense. For the remainder of this study, discussion takes place under the following headings: (1) research design, methodology and methods; (2) literature view; and (3) conclusion.

## 2. Research Design, Methodology and Methods

This study was non-empirical and exploratory in nature. Exploratory research can be regarded as research that places focus on the discovery of theoretical ideas and/or theoretical insights (Churchill, 1995). To achieve the primary aim of this study, a qualitative research methodology was decided on. Qualitative research pertains to the analysing of existing data that have been collected by other researchers (Heaton, 2003). Specifically, online desktop research was conducted since this study entailed the review of secondary data, from pre-existing sources (e.g., websites, journals, and research reports) to shed light on a particular phenomenon (Bruwer *et al.*, 2021). Despite the limitations of online desktop research, the author took reasonable steps to minimize author subjectivity through searching for secondary data by using various keywords such as “crypto”, “financial inclusion”, “cryptocurrency”, “blockchain”, “crypto assets”, “blockchain technology”, and “Zimbabwe”.

## 3. Literature Review

### 3.1. Financial Inclusion Challenges in Zimbabwe

One of the Sustainable Development Goals (SDGs) of the United Nations (UN) is to eradicate poverty by 2030 (UN, 2021). Poverty is defined as the inadequacy of resources to meet basic needs such as food, clean water, shelter, and clothing (World Vision, 2021). Poverty is a major challenge in Zimbabwe, especially since 71% of the population is reported to live below the poverty line (FinMark, 2020). Considering that the wellbeing of any nation's economy is directly impacted by internally generated socio-economic value, clear tangent planes emerge as to why Zimbabweans need to experience financial inclusion<sup>4</sup> (Reserve Bank of Zimbabwe (RBZ), 2021; UN, 2021).

The concept of “financial inclusion” speaks to the equitable and affordable access, of individuals, to financial services (Barugahara, 2021; RBZ, 2021). Such financial services can include access to bank account, access to formal investment options, and access to formal borrowing options (Chitokwido *et al.*, 2014). The stark reality is that in 2014, 23% of the Zimbabwean adult population was deemed financially excluded (RBZ, 2021). Although this is a significant improvement from the 40% statistic in 2011, there is still much room for improvement, considering that in 2017, approximately 67% were financially excluded (Masiyandima *et al.*, 2017; Barugahara, 2021; RBZ, 2021). Prior research (Barugahara, 2021; Library of Congress, 2021), suggests that financial inclusion is hindered by the following factors:

- Lack of funds to keep in a bank account;
- Lack of trust and/or confidence in banks;
- Need for privacy;
- High bank charges;

<sup>3</sup> The legalisation of BTC as official currency by the El Salvadorian government was not without resistance. Prior to its adoption, residents protested profusely to demonstrate their dissatisfaction (Murray, 2021)

<sup>4</sup> Individuals who are financially excluded are referred to as “the unbanked population” (Finextra, 2020), while those with access to limited financial services are referred to as “the underbanked population” (Micro Bilt News: 2021). In this study both these groups are deemed to be financially excluded.

- lack of convenience;
- lack of awareness; and
- lack of formal identification.

3.2. BT as a Tool to Enhance Financial Inclusion

BT depends on the phenomenon called “blockchain” – a database consisting of cryptographically connected blocks of digital data (Hum, 2021). As previously mentioned, BT has the main aim of achieving decentralization, immutability, and transparency (Chatham House Primer, 2018; Leible et al., 2019), as depicted in Figure 2.

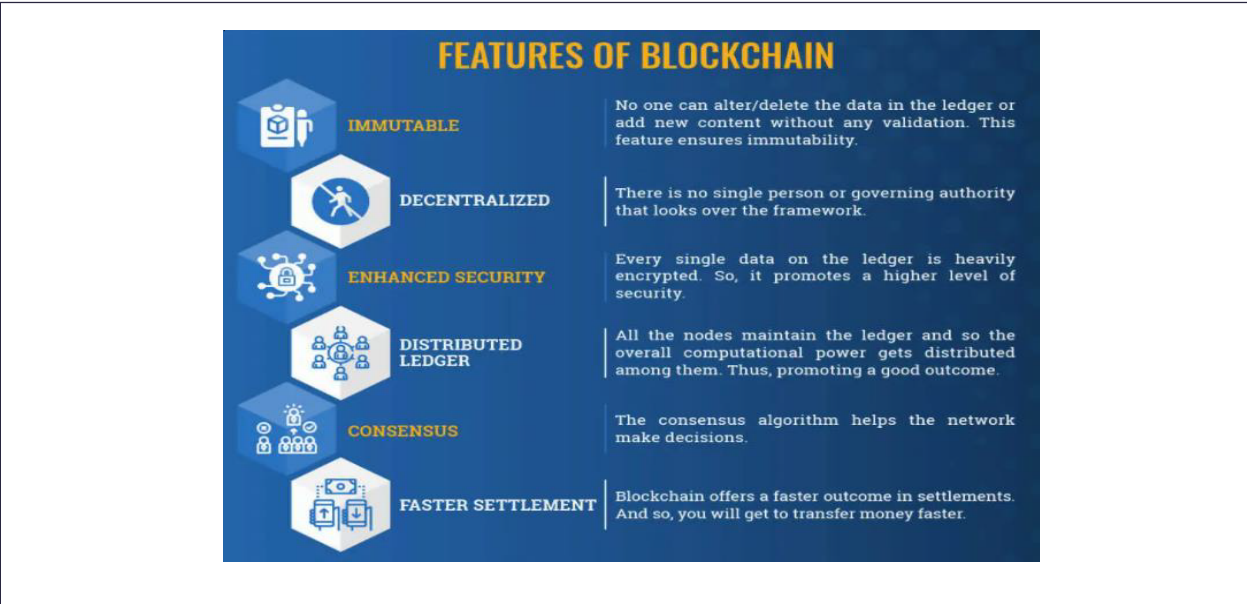


Figure 2: Key Characteristics of a Blockchain

Source: Iredale (2020)



Figure 3: Use Cases of Blockchains

Source: Iredale (2020)



Blockchains can be categorized into four groups, namely: (1) public blockchains (permissionless blockchains generally used for crypto assets and document validation); (2) private blockchains (permissioned blockchains generally used for supply chain and asset ownership purposes); (3) hybrid blockchains (semi-permissioned blockchains used for medical records and real estate); and (4) consortium blockchains (like hybrid blockchains, but more than one equal participant; generally used for banking, research and supply chain) (Iredale, 2020; Zigurat, 2021; Origin Stamp, 2021; Iredale, 2021). The uses of blockchains are briefly depicted in Figure 3.

Initially, BT was designed to support BTC, and since the creation of crypto assets like Dogecoin, Litecoin and Ethereum, its use cases have significantly increased. With the above in mind, research (Segal, 2017; Mazikana, 2018; Overdahl, 2019; Shumsky, 2020; Barugahara, 2021; BBC, 2021; BankservAfrica, 2021; Killermann, 2021; Chasi *et al.*, 2021) suggests that factors hindering financial inclusion can be addressed through BT in the following ways:

- *Lack of Funds to Keep in the Account:* In some instances, commercial banks require a minimum deposit to be made by customers, while also retaining a minimum amount in an account. When it comes to the population of Zimbabwe, the latter is almost impossible for almost three quarters of the population. In relation to BT, an individual can withdraw everything from his/her account without having to maintain a minimum balance.
- *Lack of Trust/Confidence in Banks:* This challenge is worse in Zimbabwe, considering that more than ten commercial banks closed their doors since 2004. Although BT sometimes requires the exchange of private keys<sup>5</sup>, the probability of such an exchange being compromised is much less than the potential failure of a commercial bank in Zimbabwe.
- *Need for Privacy:* When money is kept in a bank account, all electronic purchases made will be known by the bank. In addition, the bank will also know when and where money was withdrawn from an account. BT offers privacy in the sense that any transaction made by the user is only known to the user and the relevant transacting party.
- *High Bank Charges:* More often than not, financially excluded residents cannot afford to maintain bank accounts because of high bank charges. With BT, there are minimal charges when sending crypto assets from one crypto wallet<sup>6</sup> to another. In some instances, some crypto exchanges<sup>7</sup> do not charge any transfer costs. These minimal charges are also applicable when converting crypto assets to the local currency (fiat money). Furthermore, BT does not attract monthly fees as opposed to commercial bank accounts.
- *Lack of Convenience:* In a Zimbabwean dispensation, financially excluded residents are mostly located in rural areas; meaning they generally stay far from a commercial bank. With BT, crypto assets are transferrable from the comfort of a person's own home. All that is required is access to the internet and an electronic device capable of transacting with crypto assets. Furthermore, crypto exchange services are available every hour of every day.
- *Lack of Awareness:* Some residents, particularly the ones in rural areas do not even know what BTC is. Through means of awareness campaigns, residents can be made aware of BT. Commercial banks followed a similar route to make Zimbabweans aware of banks and bank services, but considering the benefits of BT, awareness campaigns can be catalysed through partnerships between the national government and FinTech companies in the country.
- *Lack of Formal Identification:* Formal identification is critical with financial inclusion initiatives. Without formal identification, it is not possible to open a bank account at a commercial bank. Formal identification documentation is currently being digitised in Zimbabwe, meaning that Zimbabweans will be able to use BT using their digital identification document.

### 3.3. BT Adoption Challenges in Zimbabwe

Notwithstanding the discussion above, there are various challenges that the Zimbabwean government will need to address before fully embracing and, evidently adopting BT. These are discussed below (RBZ, 2017; RBZ, 2018; McKenzie, 2019; Iredale, 2020; SE4ALL, 2021; Muronzi, 2021; Ndlovu, 2021; Deloitte, 2021; Moyo, 2021; Killerman, 2021; Tena, 2021; Unleash, 2021).

<sup>5</sup> A private key refers to a randomly generated sequence of words that cannot be easily guessed (Search Security, 2021).

<sup>6</sup> A crypto wallet is an application that enables crypto assets users to store and retrieve their assets (Bankrate, 2021).

<sup>7</sup> Crypto exchanges simply refers to a marketplace where users can buy, sell, and trade crypto assets (Market Business News, 2021).

- *Lack of Electricity*: In Zimbabwe, most rural areas and some urban areas do not have adequate and/or reliable electricity. Without electricity, it is difficult to optimally utilize technology and access the internet. Moreover, the capacity and reliability of power suppliers are inherently limited.
- *Lack of Access to Mobile Devices*: To make use of BT, an individual requires access to a mobile device that is capable of transacting crypto assets. At the moment, approximately 88% of Zimbabweans have access to mobile devices that are often shared among individuals.
- *Government's Stance on Crypto Assets*: Having issued a stern warning<sup>8</sup> to the public against crypto assets in 2017, the Zimbabwean government went on to ban financial institutions from facilitating crypto assets related activities. This "*do it at your own risk*" mantra is prevalent throughout the African continent. Though the Zimbabwean government's stance towards crypto assets appears to be changing for the better, it is currently not significantly convincing to positively influence the local public's perceptions.
- *Inherent Risks*: Whenever a new technology, service or product is introduced; many fraudsters capitalize on an opportunity to scam the public. This public safety concern was one of the main reasons why RBZ issued a stern public warning followed by a bank ban. Other BT related risks are money laundering, terrorism financing, and tax evasion. In essence, it is because of these risks that many countries are reluctant to regulate crypto assets. However, the "*do it at your own risk*" mantra does nothing to safeguard the public's interests. Instead, it promotes most of these very same risks governments are trying to avoid.
- *Sanctions*: Zimbabwe has been internationally sanctioned due to political reasons, and this has negatively affected the participation of Zimbabweans in the crypto space. This is mainly because most reputable crypto exchanges are not allowed to offer their services to Zimbabwe.
- *High Cost and Low Efficiency*: Some blockchains are expensive to implement and/or maintain due to their utilization of energy (electricity). It is for this reason that some countries decide to also ban crypto assets blatantly. To increase the efficiency of a blockchain network is also costly, and with a BT transaction processing speed is critical.
- *High Data Costs*: Mobile data is very expensive in Zimbabwe, and this in itself will exclude many residents from utilizing BT. Considering that the internet is required to make use of BT, Zimbabweans who wish to make use of BT should either have a stable internet connection and/or sufficient data prior to engaging blockchain transactions. For reference, 1 gigabyte of data, on average, costs US\$75 in Zimbabwe whereas the global average for the same bandwidth is US\$8. The high data costs are mainly attributable to the limited network providers that operate and remain sustainable in Zimbabwe.
- *Lack of Fundamental BT Skills*: In a 2018 study top management and employees of commercial banks in Zimbabwe lacked the skills to push for the adoption of BTC. Although this study was specifically on BTC, the results are applicable to all crypto assets. Therefore, it becomes evident that Zimbabweans, in general, lack fundamental BT skills.

### 3.4. Possible Considerations

From the research conducted, it is evident that BT has the potential of solving financial inclusion problems faced by Zimbabwe. Before BT can be fully embraced, there are key challenges that need to be addressed and overcome (see Section 3.3). Possible actions that the Zimbabwean government should consider include (Killerman, 2021; Tena, 2021; Universal Money Instrument (UMI), 2021; Bogdanoc, 2021; Moyo 2021; South Africa Reserve Bank, 2020; Unleash, 2021):

- *Lack of Electricity*: The Zimbabwean government ought to look for other means to improve the power supply in the country. Solar farms should be considered as supplementary energy supply. Though there are private solar energy providers working with the Zimbabwean government, there are too few in existence to solve the current electricity problem.
- *Lack of Access to Mobile Devices*: Government should consider partnering with local smartphone manufacturers. The mass production of smartphones will result in reduced costs of production, and government will be able to subsidise the price of such smartphones. Additionally, smartphones may even be loaded with firmware containing blockchain applications like a wallet and a crypto exchange.

<sup>8</sup> It is important to note that the RBZ never gave an outright public ban on crypto assets related activities. Instead, it gave a strong warning to the public by stating that residents participating in crypto activities are doing so at their own risk (RBZ, 2017). In essence, the ban was on financial institutions (RBZ, 2018).

- *Government's Stance on Crypto Assets:* To positively influence the public's perceptions of crypto assets, the Zimbabwean government should consider regulating one or two crypto exchanges just to test acceptance rates. This can be done by partnering with one or two commercial banks to be assigned to a few crypto exchanges. Through regulation, government will be able to: (1) determine the crypto assets public acceptance rate; (2) monitor the challenges that commercial banks might encounter in offering banking services to crypto businesses; and (3) determine how the Zimbabwe Revenue Authority (ZIMRA) can get information for tax purposes.
- *Inherent Risks:* Government should initiate workshops aimed at warning the general public about risks involved with BT. If possible, there should be dedicated TV shows and radio shows that focus on BT education. This can include financial risks (e.g., money laundering), the use of digital IDs, and relevant *Know Your Customer* (KYC) processes. Furthermore, government should also consider developing a standard Anti Money Laundering (AML) framework<sup>9</sup> that must be applied by all registered crypto exchanges.
- *Sanctions:* Government should find ways of working around those sanctions. For example, building its own exchange(s) and promoting local companies that are into BT. While building local capacity, government can outsource BT services to entities (be they individuals or businesses) willing to work with Zimbabwe.
- *High Cost and Low Efficiency:* The issue of high energy consumption should not be a problem if a blockchain that uses one of the latest consensus algorithms<sup>10</sup> is selected. Out of the three common consensus algorithms; (Proof Of Work (POW)<sup>11</sup>, Proof Of Stake (POS)<sup>12</sup> and Proof Of Authority (POA)<sup>13</sup>; POA is the most efficient one because of its scalability. One POA blockchain, the UMI blockchain, can process up to 65,535 transactions per second, which is significantly faster than VISA and MasterCard.
- *High Data Costs:* One manner in which the Zimbabwean government can decrease the cost of data is to invite private mobile data providers to come aboard by giving them tax incentives (e.g., tax exemptions on profits for the first year). As new private mobile data providers enter the market, it may result in a decrease of average data costs.
- *Lack of Fundamental BT Skills:* A proven initiative to increase fundamental BT skills was done through project Khokha<sup>14</sup> in South Africa. The first component of fundamental BT skills taught pertains to the theoretical and practical aspects of BT and specific blockchain used in the project. The Zimbabwean government could follow a similar approach to educate residents and even recognise and subsidize education institutions offering qualifications that incorporate fundamental BT skills in their curriculum.

#### 4. Conclusion

Ever since the 1920s, research has been done to become independent from prevailing old-school financial systems. During 2008, the foregoing started to become a reality with the founding of BTC; the development of BTC blockchain. As time passed, many other blockchains emerged such as Dogecoin, Litecoin and Ethereum, among other. Although the global use cases of BT are vast, this paper aimed to ascertain whether it can serve as a tool to enhance financial inclusion in a Zimbabwean dispensation. From the research conducted, it becomes apparent that BT can serve as a tool to enhance financial inclusion in developing economies such as Zimbabwe. For this to happen, the Zimbabwean government needs to adequately address and overcome key challenges that hinder the utilisation of BT in a logical and systematic manner.

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<sup>9</sup> AML framework refers to a set of regulations and procedures aimed at preventing, detecting, and managing money laundering activities ([Comply Advantage, 2021](#)).

<sup>10</sup> In any blockchain, it is vital for participants to agree on transactions being added on blocks thus, a consensus algorithm is a set of rules that blockchain participants use to decide whether a transaction is valid or not. This prevents double spending ([Oyinloye et al., 2021](#)).

<sup>11</sup> POW is where participants in a blockchain network are required to solve a complex mathematical equation by guessing, the one who gets the answer first is given the right to validate a transaction thereby adding it to the block ([BitDegree, 2021](#)).

<sup>12</sup> With POS, participants should stack a significant number of coins in order to stand a chance of being selected to validate the next transaction ([BitDegree, 2021](#)).

<sup>13</sup> Under POA, validating participants are selected through a rigorous selection process ([Bogdanoc, 2021](#)).

<sup>14</sup> Project Khokha was a proof-of-concept study to determine if a Central Bank Digital Currency (CBDC) can be used in interbank transactions ([South African Reserve Bank, 2020](#)).

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